RICHARD DAWKINS

40周年增订版

自私的基因

[英] 理查德·道金斯 著

卢允中 张岱云 陈复加 罗小舟 叶盛 译

THE EXTENDED SELFISH GENE



中信出版集团

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理查德·道金斯

2016年2月

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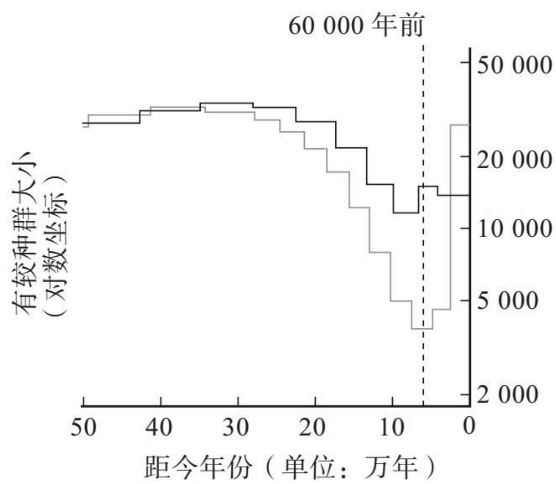
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[illegible]2012[illegible]Yan Wong[illegible]*The Ancestor’s Tale*[illegible]/[illegible]6[illegible]6[illegible]30[illegible]



来自理查德·道金斯与王岩合著的《祖先的故事》（2006，第二版）。感谢王岩提供图片。

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[4] [illegible]·[illegible]Alan Grafen[illegible]

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[illegible]DNA[illegible]

[illegible]·[illegible]Jacques Monod[illegible]·[illegible]Peter Atkins[illegible]*Creation Revisited*[illegible]

这正是光线通过密度较大介质时的行为。但光线怎么能在进入之前就已经知道哪一个是最短的行程？它又为什么要在乎这个？

[illegible]

[illegible]1972[illegible]

如果一个基因可以使其复制品聚集起来，形成基因库中一个不断增加的部分，它便会得到自然选择的青睐。我们关注的那些基因会对其携带者的社会行为产生影响。为了让我们的论证更加生动有趣，让

我们先试着暂时赋予这些基因以智慧和自由选择的意志。想象一下，一个基因正在考虑问题：如何增加其拷贝。再想象一下它可以有所选择……

我们已经考虑过在什么条件下母亲让小个子死掉事实上是合算的。如果单凭直觉判断，我们大概总是认为小个子本身是会挣扎到最后一刻的，但这种推断在理论上未必能站得住脚。一旦小个子瘦弱得使其预期寿命缩短到它从同样数量的亲代投资中获得的利益还不到其他幼儿的一半时，它就该体面而心甘情愿地死去。这样，它的基因反而能够获益。

[illegible]

就是说，一个基因发出了这样的指令：“喂，如果你个子比你的骨肉兄弟瘦小得多的话，那你不必死捱活撑，干脆死了吧！”这个基因在基因库中将取得成功，因为它在小个子体内活下去的机会本来就很小，而它却有50%的机会存在于得救的每个兄弟姐妹体内。

[illegible]

小个子的生命航程中有一个有去无回的临界点。在达到这一临界点之前，它应当争取活下去，但到了临界点之后，它应停止挣扎，宁可让自己被骨肉兄弟或父母吃掉。

[illegible]“[illegible]……[illegible]……”[illegible]

[illegible]

（这本书）非常引人入胜，但有时我希望我没有读过它……一方面，我惊叹于道金斯极为清晰且有根据地看清如此复杂的过程……但同时，我还要责怪《自私的基因》使我在之后的10多年里，不得不与抑郁症进行长期较量……我不再对生命灵魂的认识感到确定，并尝试寻找更深层次的东西——试着去相信，但却不能相信——我发现这本

书在字里行间将我所有模糊的想法都一扫而光，而且阻止这些想法重新凝聚于我的脑海中。几年前，这造成了我个人生活中的一次严重危机。

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我第一本书的一个外国出版商坦言：阅读这本书后，他失眠了3天，被书中传达的冷酷无情的信息深深困扰。另外一些人则问我每天早上如何能离开床铺。一个偏远乡村的教师写信责备我，因为一个学生读完书后含泪找到他，说这本书使她的生命变得空虚而无意义。他建议她不要把这本书给她的任何朋友看，因为他害怕这本书会使他们产生相同的虚无主义思想与悲观情绪。（摘自《解析彩虹》）

□□

想必宇宙的最终命运确实没有意义，但无论如何，我们真有必要将我们生命的希望寄托在宇宙的最终命运上吗？当然不需要，只要我们足够明智。我们的生命被其他更密切、更温暖的人类理想与感觉控制。指责科学剥夺了生命中赖以生存的温暖，是多么荒谬的错误啊，这与我本人及其他科学家的感觉截然相反。我几乎都要对这些大错特错的怀疑绝望了。

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我不是说上奇公司（Saatchi & Saatchi）曾组织一批社会生物学家[3]来撰写撒切尔夫人的演讲稿，更不是指一些牛津与苏塞克斯的君子已经开始庆幸终于可以从实际情况解读自私基因这等简单事实，尽管他们一直拼命想要这么告诉我们。这个流行理论与政治事件的巧合要更乱七八糟得多。不过我相信，20世纪70年代末期此书写成时，历史潮流转向了右翼，从法律与秩序转向货币主义与（更为矛盾的）对中央集权的抨击。之后这个转向才成为科学潮流，如果进化理论从类群选择转向亲属选择也能算的话。这个科学潮流变换将被看作推动撒切尔夫人派与其僵化的、19世纪时竞争与排外的人性概念执掌大权的社会潮流的一部分。

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理查德·道金斯

牛津，2005年10月

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[1] [illegible]·[illegible]·[illegible]Arthur James Cain[illegible]

[2] Austin Burt and Robert Trivers[illegible]2006[illegible]Genes in Conflict: the biology of selfish genetic elemen[illegible]——[illegible]

[3] [illegible]·[illegible]·[illegible]

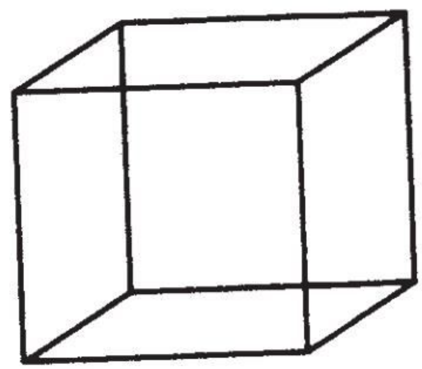
[4] [illegible]·[illegible]Robert Trivers[illegible]

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[illegible]·[illegible]Helena Cronin[illegible]

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理查德·道金斯

1989年

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[1] [illegible]·[illegible]·[illegible]Ronald Aylmer Fisher[illegible]

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[illegible]99.5%[illegible]30[illegible]

[illegible]pre-Darwinian[illegible]pre-Mendelian[illegible]Richard Dawkins[illegible]

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特里弗斯

1976年7月于哈佛大学

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理查德·道金斯

1976年

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[illegible]Thomson’s gazelles[illegible]

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[1] [illegible]Sarcomastiugophora[illegible]Lobosasida[illegible]Amoebida[illegible]——[illegible]

[2] [illegible]·[illegible]August Weismann[illegible]

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[1] [illegible]

[2] [illegible]“[illegible]”[illegible]

[3] [illegible]Herbert Spencer[illegible]1820—1903[illegible]

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[illegible]altruism investment[illegible]A[illegible]B[illegible]A[illegible]B[illegible]A[illegible]

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[illegible]F. Alvarez[illegible]·[illegible]·[illegible]L. Arias de Reyna[illegible]H.Segura[illegible]——[illegible]——[illegible]

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sex-limited gene effects

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[illegible]cleaner-fish[illegible]50[illegible]

[illegible]“[illegible]”[illegible]

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[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]——[illegible]Geoffrey Chaucer[illegible]20[illegible]“[illegible]”[illegible]

[illegible]P. F. Jenkins[illegible]9[illegible]8[illegible]CC[illegible]“[illegible]”[illegible]song pool[illegible]“[illegible]”[illegible]“[illegible]……[illegible]

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[illegible]Sir Karl Popper[illegible]——[illegible]L. L. Cavalli-Sforza[illegible]F. T. Cloak[illegible]J. M. Cullen[illegible]

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d[illegible]Arapesh[illegible]

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Auld Lang Syne [*58]

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表12-1 我在囚徒困境博弈里各种结果的输赢状况

		你的出牌	
		合作	背叛
我的出牌	合作	比较好 **相互合作的奖赏** 300 美元	很坏 **失败的代价** 100 美元罚款
	背叛	很好 **背叛的诱惑** 500 美元	比较坏 **相互背叛的惩罚** 10 美元罚款

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表12-2 鸟类清除蜱虫的博弈：我从各种结果中得到的回报

		你的出牌	
		合作	背叛
我的出牌	合作	比较好 **相互合作的奖赏** 我清除了自己的蜱虫，也付出代价清除了你的蜱虫。	很坏 **失败的代价** 我的蜱虫没被去除，还付出了代价去除你的蜱虫。
	背叛	很好 **背叛的诱惑** 我自己的蜱虫被清除了，也没有付出代价清除你的蜱虫。	比较坏 **相互背叛的惩罚** 我的蜱虫没被清除，但你的也没有，我从中得到了心理安慰。

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表12-3 阿克塞尔罗德的计算机竞赛：我在各种结果中所得的回报

		你的出牌	
		合作	背叛
我的出牌	合作	比较好 相互合作的奖赏 3 分	很坏 失败的代价 0 分
	背叛	很好 背叛的诱惑 5 分	比较坏 相互背叛的惩罚 1 分

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“我们要做的第一件事，就是把所有律师都先杀了。”

——《亨利六世》

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我们走出深夜的战壕……德国人也走了出来，所以出于礼貌，我们不该开枪。最恶劣的事情是枪榴弹……它们如果落入战壕，就会杀死大概9~10个人……但除非德国人特别吵，否则我们不应该使用这些武器。因为他们也可以采取报复，我们也许没有一个人可以回去。

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当我正在与某连的人喝茶时，我们听到许多喊叫声，于是出来查看。我们看见我们的人与德国人各自站在战壕前的矮墙上。突然炮声骤响，却无人受伤。双方很自然地卧倒，我们的人开始咒骂德国人。

这时一个勇敢的德国人站起身来大喊：“我们很抱歉，我们希望没有人受伤。我们不是故意的，都是那个该死的普鲁士大炮！”

[illegible]“[illegible]”

[illegible]

七点钟到了，英国人开炮了。他们十分准时，你都可以据此来校正手表……他们永远有着相同的目标，非常准确，从未在前后左右偏移过标志……甚至有一些好奇的同伴……会在七点前一点爬出去看英国人开炮。

[illegible]

（德国人）选择的目标、射击的时间与回合都十分规律……琼斯上校知道每一炮发出的时间。他的计算十分准确。他甚至敢于做一些初生牛犊式的行为，冒险去到炮击的地点。因为他知道炮击将在他到达前停止。

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表12-4 吸血蝙蝠的血液捐赠：在各种情况下我的回报

		你的出牌	
		合作	背叛
我的出牌	合作	比较好 **相互合作的奖赏** 在我不走运的夜晚里我能得到血液，这可以拯救我的生命。在我幸运的那些夜晚里，我需要捐出我的一些血液，这对我来说并不是什么大问题。	很坏 **失败者的代价** 我在运气好的时候用我的血液救了你的性命。但当我不幸时你却不帮助我，我有饿死的巨大风险。
	背叛	很好 **背叛的诱惑** 在我不走运的夜里你用血液救了我，但下次我走运时我却不用血液救助你，我得到更多好处。	比较坏 **相互背叛的惩罚** 在我幸运时我不花费自身任何代价来帮助你，但当我不幸时，我也有饿死的巨大风险。

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[illegible]13[illegible]

[illegible]



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[illegible]“[illegible]”[illegible]

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“[illegible]”[illegible]·[illegible]

10

Xyleborus ferrugineus

10

[illegible]*Hydra vulgaris*[illegible]*Hydra attenuata*[illegible]*Chlorohydra viridissima*[illegible]

[illegible]“[illegible]”[illegible]——[illegible]

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[illegible]“[illegible]”[illegible]

[illegible]·[illegible]Robert May[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]*Bothriomyrmex regicidus*[illegible]*B.decapitans*[illegible]“[illegible]”[illegible]

[illegible]·[illegible]Edward Wilson[illegible]“[illegible]”[illegible]

[illegible]*Monomorium santschii*[illegible]——[illegible]

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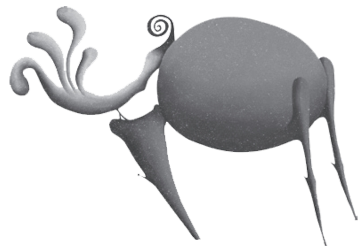
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> 我希望指出的是，认为道金斯通过使用像“机器人”和“盲目地”这些词汇来暗示进化论是认同决定论的，是全然没有根据的……一个机器人是没有思想的自动机器。或许有的动物是机器人（我们没有办法确切知晓），但是道金斯所指的不是“某些”动物，而是指全体动物，并在这件事上特指人类。现在，要想解释清楚斯戴宾（Stebbing）的意思，“机器人”可以是“有思想的东西”的对立面，或者也可以用来形象地指称一个看起来像机器一样行动的人类，但就是没有

一种日常生活中的语言会赋予“机器人”这个词一种含义，让“所有活着的生命都是机器人”这句话可以成立。（第41页）

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从成对的法兰盘到锥轴导轨，我所见是你的手，我的神！
在彼处连杆的步伐中是预言。
约翰·加尔文或许铸造过相同的一切。

[illegible]1893[illegible][10][illegible]——[illegible]——[illegible]Levy 1978[illegible]Winograd 1972[illegible]Hofstadter 1979[illegible]Evans1979[illegible]Boden 1977[illegible]10[illegible]“[illegible]”[illegible]

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[illegible]Ridley 1980[illegible]“[illegible]”——Weizenbaum 1976, p.9[illegible]Boden 1977; Evans 1979;Hofstadter 1979[illegible]

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回过头来看（进化论），令我印象极其深刻的是化学逐步让位于电子系统的方式。把最初的生命描述为整体都是化学性的，这并非没有道理。虽然电化学过程在植物中是重要的，但是能够处理数据的有序的电子信号却没有进入植物的世界。不过，当世界上有了到处活动的生物之后，原始的电子信号就开始承担重要职责了。……原始的动物所拥有的最初的电子系统本质上是制导系统，逻辑上讲近似于声呐或雷达。如果我们看看进一步进化出来的动物，就会发现电子系统不仅仅被用于制导，还被用于把动物导向食物。……

这幅场景类似于制导导弹，它的任务是拦截并摧毁另一枚导弹。正如现代世界的进攻与防御在方式上变得越来越精细一样，动物的处境也如是。精细的程度越来越高，就必须要有越来越好的电子系统。自然界中发生的情况与现代军事应用中电子设备的发展历程近乎一致。……在一个充满尖牙与利爪的丛林中，我们不应该能够拥有我们进行智慧思考的能力，不应该能够探索宇宙的结构，不应该能够欣赏贝多芬的交响乐。我发现这样的想法很令人警醒。……虑及于此，有时总会被问到的一个问题“计算机能思考吗？”就多多少少显得令人啼笑皆非了。我这里说的计算机当然是指我们自己用无机材料制造出来的那种。问这个问题的那些人到底以为他们自己又是什么呢？简单来说就是计算机，但比我们目前的知识所能制造出来的都要复杂得

多。要知道，我们的人造计算机工业只有二三十年的历史，而我们自己却是一个进化过程持续操作数亿年的产物。（第24—26页）

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[12] Gould & Lewontin 1979

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[3] [illegible]·[illegible]James Gould[illegible]

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[17] □□□□·□□□□Brian Goodwin□□□□□□□□□□□□□□□

[18] □□□·□□□□□□Deborah Charlesworth□□□□□□□□□□

[19] □□□·□□□·□□□□Alan Lloyd Hodgkin□□□□□·□□□□Andrew Huxley□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1963□□□□□□□□

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[22] [illegible]

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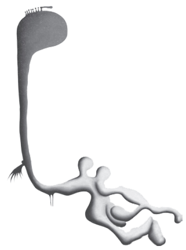
[24] [illegible]·[illegible]Richard Gregory[illegible]

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[illegible]“[illegible]”（Lewontin 1979a,b; Gould & Lewontin 1979）——[illegible]（Lewontin 1977）[illegible]“[illegible]”（Lewontin 1979b）[illegible]“[illegible]”（Lewontin 1967）[illegible][1] [illegible]（Cain 1979）。

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]（Cain 1964）[illegible]“[illegible]”[illegible]“[illegible]”（57）[illegible]·[illegible][2] [illegible]“[illegible]”[illegible][3] [illegible]

[illegible]*Cepaea nemoralis*[illegible]“[illegible]”[illegible]Cain, p.48[illegible]“[illegible]‘[illegible]’[illegible] [4] [illegible]*Polyxenus*[illegible]‘[illegible]’[illegible]”[illegible]Cain, p.51[illegible]

[illegible]·[illegible] [5] [illegible]von Frisch 1967[illegible]·[illegible] [6] [illegible]von Hess[illegible]

[illegible] [7] [illegible]Wenner 1971[illegible]·[illegible]J. L.[illegible]J. L. Gould 1976[illegible]·[illegible]·[illegible] [8] [illegible]Lindauer 1971[illegible]·[illegible]Dawkins 1969[illegible]

[illegible] [9] [illegible]Barlow 1961[illegible]

[illegible]（Dawkins 1976b; Hailman 1977）[illegible]

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[illegible]“[illegible]”[illegible]

[illegible]·[illegible]（Maynard Smith 1976）[illegible]“[illegible]‘[illegible]’[illegible]”[illegible]

[illegible]“[illegible]”。

[illegible]（Fisher & Ford 1950; Wright 1951）[illegible]（Fisher 1930b）[illegible]（Haldane 1932a）[illegible]“[illegible]”[illegible]

[illegible][10] [illegible]“[illegible]·[illegible]”[illegible]

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[illegible]——[illegible]Fisher 1930b[illegible]Lewontin 1979b[illegible]“[illegible][11][illegible]”[illegible]

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[illegible]·[illegible]1978b[illegible]1978[illegible]1966[illegible]1973[illegible]

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[illegible]“[illegible]”[illegible]·[illegible]1976[illegible]“[illegible]”[illegible]1978b[illegible]1966[illegible]“[illegible]”[illegible]

[illegible]——[illegible]——[illegible]“[illegible]”[illegible]·[illegible]“[illegible]

[illegible]”[illegible]Tinbergen[illegible]1965[illegible]“[illegible]”[illegible]1979b[illegible]“[illegible]”

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[illegible]R. D.[illegible]——[illegible]Fraenkel & Gunn 1940[illegible]30º[illegible]90º[illegible]“[illegible]”[illegible]

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[illegible]1979b[illegible]“[illegible]‘[illegible]’[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]“[illegible]‘[illegible]’[illegible]”[illegible]1974[illegible]1975[illegible]1978[illegible][13][illegible]1976[illegible]Ridley & Dawkins 1981[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]Lewontin 1979b[illegible]

[illegible]*Drosophila*[illegible]

[illegible]Weinrich 1976[illegible]“[illegible]”[illegible]X[illegible]“[illegible]”A[illegible]Y[illegible]“[illegible]”B[illegible]

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[illegible]“[illegible]”[illegible]——[illegible]

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[illegible]·[illegible][14][illegible]·[illegible][15][illegible]1978[illegible]·[illegible][16][illegible][17][illegible]·[illegible][18][illegible]“[illegible]”[illegible]

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79b[illegible]“[illegible]”[illegible]
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[illegible]1978[illegible]“[illegible]……[illegible]”[illegible]“[illegible]”[illegible]Maynard Smith & Parker 1976[illegible]

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[illegible]·[illegible]1859[illegible]177[illegible]

这与自然选择的作用是相当协调的。因为当一只新的昆虫来到岛屿上的时候，自然选择会让翅膀变大还是变小，这取决于能否有更多的个体在与海风的对抗中成功存活下去，或是通过放弃对抗海风，同时以很少甚至不再飞翔的代价存活下去。这就好像在海岸附近遭遇海难的船员所面临的情况一样：对于很会游泳的船员来说，如果他们有能力游得更远一些，那一定会更好；对于不太会游泳的船员来说，如果他们根本就游不了泳，只能困在遇险船只上，也算是好一些的结果。

[illegible]“[illegible][27][illegible]”[illegible]

[illegible]·[illegible]·[illegible]“[illegible]”[illegible]·[illegible]“[illegible]”[illegible]·[illegible]1930a[illegible]

[illegible]“[illegible][28]”[illegible]“[illegible][29]”[illegible]Tinbergen[illegible]1963[illegible]

[illegible]“[illegible]”[illegible]*Ammophila campestris*[illegible]

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[illegible]“[illegible]”[illegible]

[illegible]

[illegible]·[illegible]——[illegible]（Gould & Calloway 1980）[illegible][30]（Vermeij 1973）[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]McCleery 1978[illegible]McFarland[illegible][31][illegible]“[illegible]”[32][illegible]“[illegible]”[illegible][33][illegible]

[illegible]“[illegible]”[illegible]·[illegible]Gore Vidal[illegible]“[illegible]”

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“[illegible]”[illegible]Maynard Smith 1978b[illegible]“[illegible]‘[illegible]’[illegible]”[illegible]Dawkins & Brockman n 1980[illegible]“[illegible]10[illegible]……[illegible]”[illegible]“[illegible]”[illegible]

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Oster & Wilson 1978 McFarland &H ouston 1981

[illegible]“[illegible]”[illegible]Tinbergen 1965[illegible]

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[illegible]1980[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]——“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]Dawkins & Carlisle 1976[illegible]Dawkins 1976a[illegible]

[illegible]·[illegible]

[illegible]X[illegible]

[illegible]——[illegible]“[illegible]”[illegible]b[illegible]b[illegible]“[illegible]”[illegible]b[illegible]ESS[illegible][35][illegible][36][illegible]1978[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]·[illegible]1978[illegible]“[illegible]‘[illegible]’[illegible]”[illegible]

[illegible]Brockmann[illegible]Grafen & Dawkins 1979[illegible]Brockmann & Dawkins 1979[illegible]Baerends 1941[illegible]

[illegible]“[illegible]”[illegible][37][illegible]

[illegible]——[illegible]“[illegible]”[illegible]

[illegible]

[illegible]1979[illegible][38][illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]

[illegible]“[illegible]”[illegible]——[illegible]Fisher 1930a[illegible]“[illegible]”[illegible]

[illegible]……[illegible]“[illegible]”[illegible]

性别只是后代身上许许多多似乎由父母来控制的适应性中的一员。比如说，在受到镰状细胞贫血影响的人类群体中，一个杂合体女

性的带有显性A基因的卵子如果能够由带有隐性a基因的精子授精，或者反之，都会是有益处的，甚至终止纯合体胚胎的妊娠也是有益的。然而如果配偶也是杂合体，那么她就肯定要来一场孟德尔式的抽奖，即便这将意味着她一半的孩子会有显著降低的适应性。……在进化之中真正基础的问题可能只有在下述情况下才是可以回答的，那就是把每一个基因都视为与其他每一个基因有着终极的冲突性，甚至是同一个细胞里其他位点上的那些基因。对于自然选择，一个真正合理的理论最终必定还是基于自私的复制单元、基因，以及所有其他有能力偏差性地积累不同的变化形式的实体。

阿门！

[illegible]

[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]——[illegible]

[1] [illegible]

[illegible]

[2] [illegible]·[illegible]

[3] [illegible]·[illegible]·[illegible]Philip MacDonald Sheppard[illegible]

[4] [illegible]·[illegible]Sidnie Manton[illegible]

[5] [illegible]·[illegible]·[illegible]Karl von Frisch[illegible]

[6] [illegible]·[illegible]·[illegible]Carl von Hess[illegible]

[7] [illegible]·[illegible]Adrian Wenner[illegible]

[8] [illegible]·[illegible]Martin Lindauer[illegible]

[9] [illegible]·[illegible]Horace Barlow[illegible]

[10] [illegible]·[illegible]Sewall Wright[illegible]

[11] [illegible]·[illegible]

[12] [illegible]Everest[illegible]

[13] [illegible]·[illegible]James Weinrich[illegible]

[14] [illegible]·[illegible]Heath Robinson[illegible]

[15] [illegible]·[illegible]Rube Goldberg[illegible]

[16] [illegible]·[illegible]John Currey[illegible]

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[18] [illegible]·[illegible]Sydney Brenner[illegible]2002[illegible]

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[21] [illegible]·[illegible]Alister Hardy[illegible]

[22] [illegible]·[illegible]John Turner[illegible]

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[30] [illegible]·[illegible]Geerat Vermeij[illegible]

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下面的注解对应最初的11个章节。每一个注解都对应原文中的一个星号。

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<u>*1</u> [illegible]2[illegible]……1859[illegible]……

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[illegible]“[illegible]”[illegible]——[illegible]41——45[illegible]“[illegible]”[illegible]

2 ‘Sociobiology: The New Storm in a Teacup’

了解一个人成功的环境能够告诉你一些关于这个人的事情。这和芝加哥匪徒的哪个具体的品质没有任何关系。我同样也可以用一些其他的类比，例如一个已在英国国教会取得高位的人，或者一个被选入雅典娜神庙的人。在任何一个例子中，我比喻的主体都是基因而不是人。

‘In Defence of Selfish Genes’

1989 “ ” 1975 23% 20 30 · · · · Lancelot Hogben

<u>*3</u> [illegible]7[illegible]……[illegible]

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<u>*5</u> [illegible]16[illegible]

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[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]22[illegible]Kamin[illegible]*Not in Our Genes*[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]3[illegible]

*8 **[illegible]27[illegible]……[illegible]**

[illegible]“[illegible]”[illegible]93——96[illegible]‘Caring Groups and Selfish Genes’[illegible]·[illegible]·[illegible]

> 没有基因来“定义”那些毫不含糊的形体特征，例如你的左膝盖骨或手指甲。身体不可能被细分为部件，而每个部件由一个单独的基因负责建造。成百的基因为制造大部分的身体组件做出了贡献……

[illegible]27[illegible]

制造人体是一种相互配合的、错综复杂的冒险事业，为了共同的事业，某一个基因做出的贡献和另一个基因做出的贡献几乎是分不开的。一个基因对人体的不同部分会产生许多不同的影响。人体的某一部分会受到许多基因的影响，而任何一个基因所起的作用都依赖于同许多其他基因的相互作用。

□□□40□□□

不论基因在世世代代的旅程中多么独立和自由，但它们在控制胚胎发育方面并不是非常自由和独立的行为者。它们以极其错综复杂的方式相互配合和相互作用，同时又和外部环境相互配合和相互作用。诸如“长腿基因”或者“利他行为基因”这类表达方式是一种简便的形象化说法，但理解它们的含义是重要的。一个基因，不可能单枪匹马地建造一条腿，不论是长腿或是短腿。构造一条腿是多基因的一种联合行动，外部环境的影响也是不可或缺的，因为腿毕竟是由食物铸造出来的！但很可能有这样的一个基因，它在其他条件不变的情况下，往往使腿生长得比在它的等位基因的影响下生长的腿长一些。

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道金斯将需要另外一个隐喻：基因核心小组，形成同盟，为加入一个盟约的机会而服从，找出大概的环境。

[illegible]42-44[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

基因被选择，不是因为它在孤立状态下的“好”，而是由于它在基因库中的其他基因这一背景下工作得好。好的基因必须能够和与之长期共同生活于一系列个体内的其他基因和谐共存，相互补充。（96页）

[illegible]116——117[illegible]239——247[illegible]

<u>*9</u> [illegible]32[illegible]

[illegible]

我用基因这个词来表达“那个能够以可察觉的频率分离又重组的东西”……一个基因可以被定义为任何一种遗传信息，该遗传信息存在一个数倍于其内部变化速率的有利或不利的选择偏好。

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]1976[illegible]20[illegible]30[illegible]“[illegible]”[illegible]·[illegible]238——247[illegible]‘Defense of Reductionism in Evolutionary Biology’[illegible]D. L. Hull[illegible]K. Sterelny[illegible]P. Kitcher[illegible]M. Hampe[illegible]S. R. Morgan[illegible]

<u>*10</u> [illegible]38[illegible]……[illegible]……

[illegible]97——99[illegible]‘Replicators and Vehicles’[illegible]

[illegible]/[illegible]

[illegible]X[illegible]“[illegible]”[illegible]

<u>*11</u> [illegible]44[illegible]……

[illegible]1957[illegible]‘Pleiotropy Natural Selection and the Evolution of Senescence’[illegible]1952[illegible]*An Unsolved Problem in Biology*[illegible]1957[illegible]*The Uniqueness of the Individual*[illegible]“[illegible]”[illegible]“[illegible]”[illegible]‘The Moulding of Senescence by Natural Selection’[illegible]“[illegible]”[illegible]46——47[illegible]

***12** [illegible]**47**[illegible]

[illegible]·[illegible]G. Bell[illegible]R. Michod[illegible]B. Levin[illegible]·[illegible]Jeremy Cherfas[illegible]·[illegible]John Gribbin[illegible]*The Redundant Male*[illegible]

***13** [illegible]**49**[illegible]**……**[illegible]**DNA……**[illegible]**……**

[illegible]184[illegible]

[illegible]DNA[illegible]Doolittle[illegible]Sapienza[illegible]“[illegible]DNA”[illegible]*Hen’s Teeth and Horse’s Toes*[illegible]DNA[illegible]“[illegible]DNA[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

道金斯的自私的基因在比例上增多是因为它们能够对身体起作用，协助身体应付生存问题。自私的DNA在比例上增多则是出于完全相反的原因——因为它对身体没有任何作用……

[illegible]DNA[illegible]DNA[illegible]

[illegible]49[illegible]DNA[illegible]206[illegible]“[illegible]”[illegible]“[illegible]DNA”[illegible]

[illegible]“[illegible]”——[illegible]“[illegible]”[illegible]DNA[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]DNA”[illegible]DNA[illegible]“[illegible]”[illegible]“[illegible]DNA”[illegible]

[illegible]DNA[illegible]156——164[illegible]

[illegible]4[illegible]

<u>*14</u> [illegible]55[illegible]……

[illegible]——[illegible]

[illegible]——[illegible]——[illegible]55[illegible]“[illegible]”[illegible]

[illegible]58[illegible]
[illegible]
[illegible]*Spectator*[illegible]
[illegible]·[illegible]1988[illegible]10[illegible]7[illegible]

一位知名选手被计算机击败现在似乎还能造成轰动，但可能不会持续太久了。迄今为止，挑战人类大脑的最危险的金属怪物被古怪地命名为“沉思”，毫无疑问这是在向道格拉斯·亚当斯（Douglas Adams）致敬。“沉思”最近一次出风头是在8月份于波士顿举行的美国公开赛上，它搅得现场人心惶惶。我手头还没有“沉思”的综合评分，该评分应该是对其在瑞士制公开竞赛的成绩的严格测试。但我注意到了它对战伊戈尔·伊万诺夫并取得了非常引人注目的胜利——伊万诺夫曾经击败过卡尔波夫！注意，这也许就是国际象棋的未来。

[illegible]“[illegible]”[illegible]22[illegible]

精彩的一步……它的想法是让皇后占据中心……这个想法直接导致了这一场非常快速的胜利……这个惊人的结局……现在黑方皇后的侧翼已经因该皇后的侵入而被彻底摧毁了。

[illegible]

一次令人绝望的尝试，计算机满不在乎地忽略了……最终蒙羞。“沉思”忽略了皇后的再次提子，转而突然将死……黑棋告负。

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

<u>*15</u> [illegible]59[illegible]200[illegible]

[illegible]A[illegible]200[illegible]200[illegible]200[illegible]200[illegible]

[illegible]·[illegible]

<u>*16</u> [illegible]61[illegible]……[illegible]

[illegible]“[illegible]”[illegible]

[illegible]·[illegible]“[illegible]

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<u>*17</u> [illegible]66[illegible]

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[illegible]1988[illegible]Gifford Lecture[illegible]

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[illegible]Darwin Lecture[illegible]·[illegible]

[illegible]

[illegible]

[illegible]

[illegible]“[illegible]”[illegible]

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[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]1988[illegible]Jacobsen Lecture[illegible]

[illegible]·[illegible]*The Inner Eye*[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]

<u>*18</u> [illegible]67[illegible]……

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

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<u>*19</u> [illegible]67[illegible]

[illegible]“[illegible]”[illegible]

<u>*20</u> [illegible]70[illegible]

[illegible]·[illegible]13[illegible]

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[illegible]·[illegible]9[illegible]

[illegible]5[illegible] [illegible]

<u>*21</u> [illegible]79[illegible]

[illegible]ESS[illegible]ESS[illegible]

[illegible]·[illegible]ESS[illegible]

[illegible]ESS[illegible]·[illegible]*Evolution and the Theory of Games*[illegible]1982[illegible]·[illegible]·[illegible]ESS[illegible]“[illegible]”[illegible]‘Good Strategy or Evolutionarily Stable Strategy?’[illegible]

<u>*22</u> [illegible]85[illegible]……[illegible]

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[illegible]ESS[illegible]ESS[illegible]9[illegible]

<u>*23</u> [illegible]86[illegible]

[illegible]ESS[illegible]“[illegible]……”[illegible]

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<u>*26</u> [illegible]93[illegible]……[illegible]

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<u>*27</u> [illegible]95[illegible]……ESS[illegible]

[illegible]ESS[illegible]E. O. [illegible]ESS[illegible]ESS[illegible]——[illegible]ESS[illegible]ESS[illegible]ESS[illegible]

<u>*28</u> [illegible]98[illegible]

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lve Misunderstandings of Kin Selection’[illegible]5[illegible]

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[illegible]‘Geometric View of Relatedness’[illegible]

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[illegible]“[illegible]”[illegible]

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<u>*31</u> [illegible]108[illegible]……[illegible]……[illegible]

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[illegible]1977[illegible]

[illegible]“[illegible]”[illegible]

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[illegible]$\frac{1}{16}$”[illegible]109[illegible]

<u>*33</u> [illegible]109[illegible]

[illegible]E. O. [illegible]

[illegible]“[illegible]”[illegible]——[illegible]——[illegible]

[illegible]“[illegible]”[illegible]“[illegible]

[illegible]”[illegible]

[illegible]“[illegible]”[illegible]

<u>*34</u> [illegible]111[illegible]……[illegible]……

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]·[illegible]Marshall Sahlins[illegible]*The Use and Abuse of Biology*[illegible]

强调一点，由于缺少语言学上关于如何计算关系系数r的支持，这个认识论问题成了亲属选择理论的一个重大缺陷。世界上只有极少的语言有分数这个概念，例如印欧语系以及存在于近东和远东的一些古代文明。但对于所谓的原始人类来说，他们根本没有这个概念。猎手和采集者们通常不需要超过一、二、三的计数系统。我都避免去提及更大的问题，动物们该怎么去搞清楚r（自己，第一代堂兄弟）=$\frac{1}{8}$。

[illegible]12[illegible]

对塞林斯来说真可惜，他居然屈服于诱惑而“避免去提及”动物是如何“搞清楚”r的。他想要嘲弄的这个非常荒谬的观点应该敲响他头脑里的警钟。一只蜗牛的壳是一个优雅的对数螺线，但蜗牛在哪里保管它的对数表呢？因为它眼睛里的晶体缺少对计算折射系数m的“语言学支持”，它又是怎么看对数表呢？绿色植物又是怎么“搞清楚”叶绿素的化学式的呢？

[illegible]

[illegible]“[illegible]”[illegible]111[illegible]——[illegible]——[illegible]

***35 [illegible]114[illegible]……[illegible]……**

[illegible]……

[illegible]“[illegible]”[illegible]*Kin Recognition in Animals*[illegible]·[illegible]Pamela Wells[illegible]……[illegible]

[illegible]

all good kumrads you can tell

by their altruistic smell

e. e. cummings

[illegible]

***36 [illegible]114[illegible]……**[illegible]

[illegible]

[illegible]

[illegible]“[illegible]‘[illegible]’[illegible]‘[illegible]’[illegible]”[illegible]“[illegible]”[illegible]

[illegible]·[illegible]Patrick Bateson[illegible]

[illegible]

[illegible]*37 [illegible]119[illegible]……

[illegible]

[illegible]*38 [illegible]121[illegible]

[illegible]A. Pusey[illegible]12[illegible]

[illegible]*39 [illegible]121[illegible]C[illegible]……

[illegible]

[illegible]——[illegible]

[illegible]——[illegible]

[illegible]9[illegible]“[illegible]”[illegible]

[illegible]10[illegible]——[illegible]“[illegible]”[illegible]

<u>*40</u> [illegible]122[illegible]……[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]‘[illegible]’[illegible]”[illegible]122[illegible]·[illegible]

[illegible]7[illegible] [illegible]

<u>*41</u> [illegible]127[illegible]-[illegible]……[illegible]

[illegible]-[illegible]1978[illegible]

现在，理论生物学家达成共识——想要做出一个可信模型让慢吞吞的类群选择打败迅猛的自私基因是不现实的，那些迅猛的自私基因能够带给每一个个体好处。因此我接受他们的意见。

[illegible]

[illegible]“[illegible]”[illegible]10[illegible]·[illegible]·[illegible]

[illegible]·[illegible]

[illegible]8[illegible] [illegible]

***42 [illegible]143[illegible]1972[illegible]……[illegible]……**

[illegible]20[illegible]70[illegible]8[illegible]“[illegible]……”[illegible]——[illegible]1974[illegible]

***43 [illegible]156[illegible]**

[illegible]1980[illegible]*Darwinism and Human Affairs*[illegible]39[illegible]——[illegible]·[illegible]

[illegible]

[illegible]

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[illegible]

[illegible]“[illegible]”[illegible]——[illegible]

[illegible]9[illegible] [illegible]

<u>*44</u> [illegible]162[illegible]……[illegible]

[illegible]“[illegible]”[illegible]12[illegible]

[illegible]

[illegible]·[illegible]Martin Daly[illegible]·[illegible]Margo Wilson[illegible]*Sex*[illegible] *Evolution*[illegible] *and Behavior*[illegible]·[illegible]Donald Symons[illegible]*The Evolution of Human Sexuality*[illegible]

<u>*45</u> [illegible]**164**[illegible]**……**[illegible]

[illegible]

[illegible]A[illegible]B[illegible]A[illegible]B[illegible]A[illegible]B[illegible]A[illegible]B[illegible]

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[illegible]A[illegible]B[illegible]A[illegible]A[illegible]A[illegible]B[illegible]A[illegible]B[illegible]

[illegible]164[illegible]

<u>*46</u> [illegible]**173**[illegible]

[illegible]·[illegible]·[illegible]·[illegible]Richard Sibly[illegible]·[illegible]Guard[illegible]Desert[illegible]“[illegible]/[illegible]/[illegible]”[illegible]

[illegible]5[illegible]ESS[illegible]·[illegible]——[illegible]ESS[illegible]“[illegible]”[illegible]·[illegible]“[illegible]”

*47 [illegible]176[illegible]

[illegible]·[illegible]P. [illegible]P. Schuster[illegible]K. [illegible]K. Sigmund[illegible]

[illegible]$\frac{5}{8}$[illegible]$\frac{3}{8}$[illegible]

[illegible]

[illegible]176[illegible]

[illegible]

[illegible]

简要来说，我们能得出两个结论：

（a）两性之间的争斗与捕食之间有着很多共同点；以及

（b）情侣之间的行为就像月亮一样有着盈亏变化，并且像天气一样难以预测。

当然，人们在此之前并不需要用微分方程才能计算出这点。

<u>*48</u> [illegible]179[illegible]……[illegible]……[illegible]

[illegible]·[illegible]·[illegible]

[illegible]

<u>*49</u> [illegible]182[illegible]……[illegible]……

[illegible]R.[illegible]R. Lande[illegible]

[illegible]8[illegible]

[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]3[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]

[illegible]10[illegible]——[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

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[illegible]——[illegible]——[illegible]

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<u>*50</u> 183□□……□□□□……□□□□□“□□□□□□”□

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3. [illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]——[illegible]

4. [illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”

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1. [illegible]ESS[illegible]

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3. [illegible]——[illegible]

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[illegible]——[illegible]——[illegible]——[illegible]“[illegible]”[illegible]197[illegible]

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<u>*51</u> [illegible]200[illegible]……[illegible]

[illegible]“[illegible]”[illegible]·[illegible]Jennifer Jarvis[illegible]·[illegible]Robert Brett[illegible]·[illegible]·[illegible]Paul Sherman[illegible]·[illegible]·[illegible]·[illegible]

[illegible]70[illegible]80[illegible]2[illegible]3[illegible]3.2[illegible]4.8[illegible]3[illegible]4[illegible]

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·Linda Gamlin

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“ ” cyclic inbreeding theory S.

S. Bartz 7

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[illegible]

[illegible]A[illegible]B[illegible]

[illegible]

[illegible]

[illegible]“[illegible]”[illegible]

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[illegible]7[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

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[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

<u>*53</u> [illegible]204[illegible]3:1[illegible]……

[illegible]·[illegible]·[illegible]3:1[illegible]

[illegible]·[illegible]75——76[illegible]

在任何一个可以想到的群体性别比例中，那些潜在的职虫始终在照看兄妹还是照看子女中保持中立。因此我们可以假设群体性别比例是偏向雌性的，甚至假设它符合特里弗斯和黑尔预言的3：1的比例，

因为职虫与它的姐妹相对于与它的兄弟或任一性别的后代都要更亲，那么看起来在这样一个雌性偏向的性别比例中，它应该“更愿意”照顾兄妹而不是子女：当它选择兄妹的时候，难道它没有得到最有价值的妹妹吗（外加一小撮无用的弟弟）？但是这个观点忽略了在这样一个雄性稀少的群体中雄性繁殖能力的巨大价值。职虫们可能和它的兄弟们并不那么亲，但如果雄性在整个群体中很稀少，每一个这样的兄弟都有相对更高的可能性成为未来世代的祖先。

<u>*54</u> [illegible]213[illegible]ESS[illegible]

[illegible]J. L. [illegible]J. L. Mackie[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]ESS[illegible]ESS[illegible]“ESS[illegible]”[illegible]

[illegible]11[illegible] [illegible]

<u>*55</u> [illegible]221[illegible]

[illegible]‘Universal Darwinism’[illegible]

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[illegible]“[illegible]”[illegible]“[illegible]”[illegible]13[illegible]12[illegible]“[illegible]”[illegible]

<u>*58</u> [illegible]224[illegible]*Auld Lang Syne*[illegible]

“Auld Lang Syne”[illegible]“For the sake of auld lang syne”[illegible]Burns[illegible]“For auld lang syne”[illegible]“the sake of”[illegible]“[illegible]”[illegible]“For the sake of”[illegible]

[illegible]“s”[illegible]“s”[illegible]“s”[illegible]“sake”[illegible]“k”[illegible]19[illegible]“Forauld lang syne”[illegible]“For the sake of auld lang syne”[illegible]“For auld lang syne”[illegible]“s”[illegible]“k”[illegible]

[illegible]“For the sake of auldlang syne”[illegible]
[illegible]“[illegible]”[illegible]“For auld lang syne”[illegible]

[illegible]Rule Britannia[illegible]“Britannia[illegible]rule the waves”[illegible]“Britannia rules the waves”[illegible]“s”[illegible]·[illegible]James Thompson[illegible]Britannia, go out and rule the waves[illegible]let Britannia rule the waves[illegible]Britannia, as a matter of fact[illegible]does rule the waves[illegible]

[illegible]“God saves our gracious Queen”[illegible]

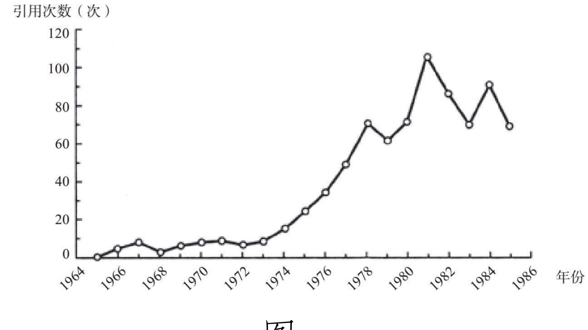
<u>*59</u> [illegible]224[illegible]

[illegible]“[illegible]”[illegible]

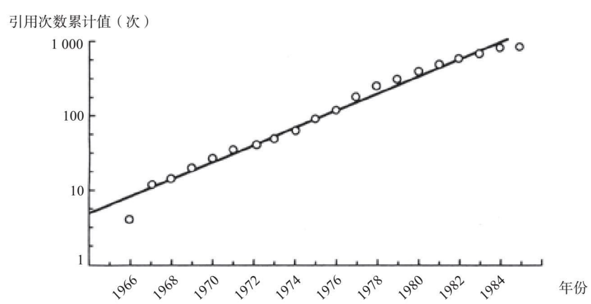
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□□102□□□“□□1964□□1970□□□”□□1976□□1964□□20□□70□□1973□□1974□□□□□□□□□1981□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

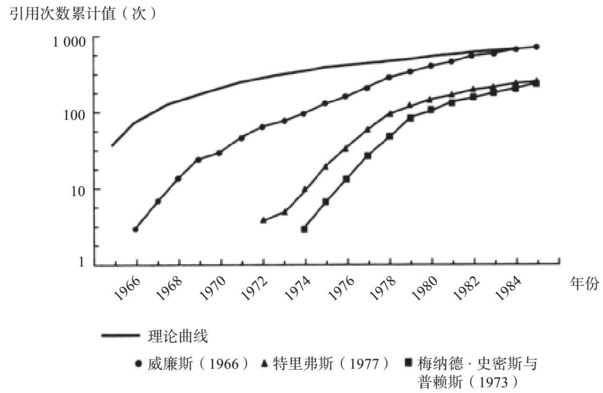
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图一


引用次数累计值（次）
1 000
100
10
1
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
年份

图二



图三

[illegible]1996[illegible]1971[illegible]·[illegible]1973[illegible]ESS[illegible]1970[illegible]

[illegible]“Auld Lang Syne”[illegible]“Rule Britannia”[illegible]1964[illegible]“The genetical evolution of social behaviour”[illegible]20[illegible]70[illegible]“The genetical theory of soci al behaviour”[illegible]·[illegible]Jon Seger[illegible]·[illegible]Paul Harvey[illegible]

[illegible]E. O. [illegible]1975[illegible]

[illegible]

[illegible]——[illegible]——[illegible]

[illegible]——[illegible]“[illegible]

[illegible]”——[illegible]

[illegible]1970[illegible]“The genetical theory of social behaviour”[illegible]5[illegible]

[illegible]1970[illegible]

[illegible]“Auld Lang Syne”[illegible]

[illegible]R. A.[illegible]*The Genetical Theory of Natural Selection*[illegible]

<u>*60</u> [illegible]227[illegible]

[illegible]——[illegible]——[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]

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[illegible]“[illegible]”[illegible]——[illegible]——“[illegible]”[illegible]“[illegible]”[illegible]

<u>*61</u> [illegible]228[illegible]

[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]·[illegible]·[illegible]*Dirk Gently's Holistic Detective Agency*[illegible]

[illegible]

[illegible]·[illegible]Keith Henson[illegible]“[illegible]”[illegible]“[illegible]……[illegible]”[illegible]

<u>*62</u> [illegible]**232**[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

> 大脑对于还原论者来说是一个确定的生物体，其性质就产生了我们观察到的行为以及从这些行为中领会到的思想状态或者意图……这样的观点是，或应该是，完全与威尔逊和道金斯的社会生物学原理相符的。然而，要采纳这个观点就会将这些原理引入一个两难境地。首先是争辩对于自由的人，人们觉得毫无吸引力（怨恨、教条化等）的行为是先天存在的。然后开始纠结于对犯罪行为的自由主义道德考

量，因为这些行为像其他行为一样是生物上决定好的。为了避免这个问题，威尔逊和道金斯许下了一个自由的愿望，只要我们非常希望，我们就能够摆脱基因对我们的控制……这实质是回归到了难堪的笛卡尔哲学，一个二重性问题。

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Baldwin/Waddington Effect

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[illegible]genetic drift[illegible]

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[illegible]group selection[illegible]

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[illegible]heritability[illegible]

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[illegible]（heterozygous）

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[illegible]（homozygous）

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[illegible]（inclusive fitness）

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[illegible]（kin selection）

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[illegible]（locus）

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[illegible]

[illegible]（Müllerian mimicry）

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[illegible]（mutation）

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[illegible]（phenotype）

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彼得·梅达沃

发表于《旁观者》（The *Spectator*），

1977年1月15日

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本书的论点是，我们以及其他一切动物都是各自的基因所创造的机器……我将要论证，成功基因的一个突出特性就是其无情的自私性。这种基因的自私性通常会导致个体行为的自私性。然而我们也会看到，基因为了更有效地达到其自私的目的，在某些特殊情况下，也会滋长一种有限的利他主义。上句中，“特殊”和“有限”是两个重要的词。尽管我们可能觉得这种情况难以置信，但对整个物种来说，普遍的爱和普遍的利益在进化论上简直是毫无意义的概念。

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1977年5月13日（节选）

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[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

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约翰·梅纳德·史密斯写于《伦敦图书评论》，

1982年2月4—18日。（节选自对《延伸的表型》的评论）

[illegible]·[illegible]*The Life of the Robin*[illegible]——[illegible]——[illegible]

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[illegible]20[illegible]60[illegible]70[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]-[illegible]“[illegible]”[illegible]——[illegible]……

[illegible]……[illegible]“[illegible]”[illegible]……[illegible]……

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本书第1章至第11章采用卢允中、张岱云两位先生的译文。因无法与权利人取得联系，敬请权利人与编辑联系（maxiaoling@citicpub.com），我们将按规定标准支付翻译费。特此致谢！